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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

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INVENTOR(S)					
Given Name (first and middle (if any))		Family Name or Surname		Residence (City and either State or Foreign Country)	
Dina L. James B. Kim		Richman Ballard Watson		Philadelphia, PA Medford, NJ Cherry Hill, NJ	
Additional inventors are being named on the _____ separately numbered sheets attached hereto					
TITLE OF THE INVENTION (500 characters max)					
Insecticidal Compositions for Control of General Household Pests					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
<input type="checkbox"/> Customer Number: _____ OR <input checked="" type="checkbox"/> Firm or Individual Name: Patent Administrator, FMC Corporation					
Address: 1735 Market Street					
Address: _____					
City: Philadelphia		State: PA		ZIP: 19103	
Country: United States of America		Telephone: 215-299-6985		Fax: 215-299-6984	
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[Page 1 of 1]

Respectfully submitted,

SIGNATURE John M. Sheehan

TYPED or PRINTED NAME John M. Sheehan

TELEPHONE 215-299-6966

Date 01/09/04

REGISTRATION NO. 26,065

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INVENTOR(S)/APPLICANT(S)

Given Name (first and middle [if any])	Family or Surname	Residence (City and either State or Foreign Country)
Cristi L.	Palmer	Hightstown, NJ

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Practitioner's Docket No. 60336-USA-PROV1

Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Dina L. Richman, James B. Ballard, Kim Watson, Cristi L. Palmer

Application No.: to be assigned

Filed: 1/09/2004

For: Insecticidal Compositions for Control of General Household Pests

**Commissioner for Patents
Alexandria, VA 22313-1450**

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**INSECTICIDAL COMPOSITIONS FOR CONTROL OF GENERAL
HOUSEHOLD PESTS**

The present invention relates generally to insecticidal compositions. In particular, it pertains to compositions of insecticides useful for control of general household pests.

BACKGROUND OF THE INVENTION

General household pests are insects that have the potential to cause nuisance or harm to person and property, such as the German cockroach, American cockroach, Smokey-Brown cockroach, Oriental cockroach, house fly, red imported fire ant (RIFA), odorous house ant, carpenter ant, pharaoh ant, Argentine ant, mosquito, tick, flea, sowbug, pillbug, centipede, spider, silverfish, scorpion and bed bug. The following are some examples of nuisance or harm to persons and property. Cockroaches and flies can appear in people's living environment at any place and at any time. They generally contaminate food and articles subjecting people to threats of bacteria and viruses. The continued proliferation of colonies of red imported fire ants, *Solenopsis invicta*, are becoming a serious problem in the United States. Fire ants are attracted to electrical circuits and can cause failures in transformers, cables, connectors and related electrical hardware. Fire ants also can sting persons or animals and generally cause a localized allergic reaction on the area of the skin punctured by their stinging. Some individuals suffer a severe allergic reaction that can lead to anaphylactic shock, which can be fatal if not treated promptly. Many of the general household pests are potentially dangerous since their bites or stings can similarly lead to allergic reaction.

Insecticidal compositions have commonly been used to control general household pests. Of primary concern in developing an insecticidal composition to control general household pests is the insecticide's 'knockdown' and 'mortality' characteristics. Knockdown refers to quick (usually within 10 minutes, depending on the pest), short-term immobilization or death of the pest. Mortality refers to death of the pest. An optimal insecticide composition would have knockdown and mortality rates at or near 100% for all general household pests. Current insecticidal compositions, for example,

have red imported fire ant and German cockroach mortality rates approaching 100%, but their knockdown rates are only 80% or less for red imported fire ants and 40% or less for German cockroaches. Improved knockdown rates are desirable to ensure effective protection of persons and property from general household pests.

In the present invention a new insecticidal composition has been developed to significantly improve knockdown rates of general household pests.

SUMMARY OF THE INVENTION

It has now been unexpectedly found that applications of an insecticidal composition containing a mixture of a pyrethroid and at least one of imidacloprid, flonicamid, nithiazine, thiamethoxam, dinotefuran, nitenpyram, thiacloprid, clothianadin, or chlorfenapyr, results in a continuous chemical barrier that provides both high knockdown and mortality rates to general household pests. Other aspects of the present invention will also be apparent.

DETAILED DESCRIPTION OF THE INVENTION

It has now been unexpectedly found that an insecticidal composition containing a mixture of a pyrethroid and at least one of imidacloprid, flonicamid, nithiazine, thiamethoxam, dinotefuran, nitenpyram, thiacloprid, clothianadin, or chlorfenapyr, results in high knockdown and mortality rates of general household pests. Preferred compositions are those wherein the pyrethroid is bifenthrin, cypermethrin, zeta cypermethrin, lambdacyhalothrin, betacyhalothrin, alphacypermethrin, tralomethrin, deltamethrin, cyfluthrin, beta-cyfluthrin, esfenvalerate, fluvalinate, etofenprox or permethrin. Further preferred compositions are those wherein the pyrethroid is bifenthrin. More preferred compositions are those wherein the mixture is bifenthrin and imidacloprid. Even more preferred compositions of the present invention are comprised of 0.0005% by weight to 0.12% by weight of bifenthrin and 0.0005% by weight to 0.10% by weight of imidacloprid.

A liquid insecticide is any formulation containing an insecticide where the formulation is dispensed in an aqueous medium prior to its application to a locus where general household pest control is needed. That is to say, a liquid insecticide is made up

of 1) an insecticide, 2) an aqueous medium and 3) other additives conventionally employed in insecticidal formulations (e.g. surfactants, wetting agents, freeze/thaw agents). All formulations of insecticides that are or can be dispensed in an aqueous medium prior to application are, therefore, within the scope of the present invention (e.g. Micro-emulsions, Suspension concentrates, Emulsifiable concentrates, Wettable powders, Water dispersible granules, Capsule suspensions, Emulsifiable granules or combinations thereof).

The compositions of the present invention may be derived from commercially available formulations of insecticides. For example, bifenthrin, sold by FMC Corporation under the names and trademarks of TALSTAR®GC FLOWABLE INSECTICIDE/MITICIDE, or TALSTARONE® MULTI-INSECTICIDE, to name a few, find utility in the present invention. Using methods known to one skilled in the art, the above-mentioned formulations of insecticides can be dispersed in an aqueous medium to provide a composition containing an insecticidally effective amount of an insecticide.

The following examples further illustrate the present invention, but, of course, should not be construed as in any way limiting its scope. The examples set forth certain biological data illustrating the efficacy of the compositions of the present invention in controlling general household pests. Unless otherwise indicated, all parts, percentages, and the like are by weight.

EXAMPLE 1

Test to Determine German Cockroach Knockdown and Mortality Rates by Applications of Combinations of Bifenthrin and Imidacloprid

The compositions of the present invention were tested for German cockroach activity in the following manner:

Test compositions made up of TALSTARONE® MULTI-INSECTICIDE and a wettable powder of imidacloprid in distilled water were prepared that provided appropriate rates of application of combinations of bifenthrin and imidacloprid, as well as bifenthrin and imidacloprid alone.

The spray chamber was then calibrated to deliver the treatment solution at the desired volume and pressure over the desired area on the chamber shelf. Spray chamber

shelf height was adjusted to approximately 18 inches from the spray tip. The shelf was then covered with aluminum foil and the center of the shelf from front-to-back and end-to-end was determined. A desired number of 4.0" sieve circles were marked on the aluminum foil with a permanent marker. The inside of a desired number of PVC rings were coated with a petroleum jelly / mineral oil mixture (1:2 ratio). The PVC rings were placed on the sieve circles. 10 male German cockroaches were placed inside each PVC ring. The sprayer was activated and the test compound was applied to each PVC ring interior. German cockroach knockdown and mortality were measured. The following results were recorded:

Table 1
Knockdown and Mortality of German Cockroach by Application of Combinations of Bifenthrin and Imidacloprid

Treatment	Rate of Appln. (PPM)	Rate of Appln. (% by weight)	Knockdown Rate @ 10 minutes (%)	Mortality Rate @ 30 minutes (%)
A	600	0.06	0	60
B	1000	0.10	10	73
A + B	600 / 1000	0.06 / 0.10	20	95
A + B	600 / 500	0.06 / 0.05	15	95
A + B	600 / 250	0.06 / 0.025	15	90
Untreated	0	0	0	0

A is bifenthrin

B is imidacloprid

EXAMPLE 2

Test to Determine Red Imported Fire Ant Knockdown and Mortality Rates by Applications of Combinations of Bifenthrin and Imidacloprid

The compositions of the present invention were tested for red imported fire ant activity in the following manner:

Test compositions made up of TALSTARONE® MULTI-INSECTICIDE and a wettable powder of imidacloprid in distilled water were prepared that provided appropriate rates of application of combinations of bifenthrin and imidacloprid, as well as bifenthrin and imidacloprid alone.

The spray chamber was then calibrated to deliver the treatment solution at the

desired volume and pressure over the desired area on the chamber shelf. Spray chamber shelf height was adjusted to approximately 18 inches from the spray tip. The shelf was then covered with aluminum foil and the center of the shelf from front-to-back and end-to-end was determined. The red imported fire ants to be treated were collected and placed in screened 16 oz paper cups. The paper cups were placed onto the aluminum foil on the spray chamber shelf. The sprayer was activated and the test compound was applied to each paper cup interior. Red imported fire ant knockdown and mortality were measured. The following results were recorded:

Table 2
Knockdown and Mortality of Red Imported Fire Ant by Application of Combinations of Bifenthrin and Imidacloprid

Treatment	Rate of Appln. (PPM)	Rate of Appln. (% by weight)	Knockdown Rate @ 10 minutes (%)	Mortality Rate @ 30 minutes (%)
A	600	0.06	40	100
B	1000	0.10	0	33
A + B	600 / 1000	0.06 / 0.10	98	100
A + B	600 / 500	0.06 / 0.05	83	100
A + B	600 / 250	0.06 / 0.025	65	100
Untreated	0	0	0	0

A is bifenthrin

B is imidacloprid

In the context of the present invention, the term "insecticide" refers to the active chemical compound or ingredient, such as bifenthrin, cypermethrin, zeta cypermethrin, lambdacyhalothrin, betacyhalothrin, alphacypermethrin, tralomethrin, deltamethrin, cyfluthrin, beta-cyfluthrin, esfenvalerate, fluvalinate, etofenprox, permethrin, imidacloprid, flonicamid, nithiazine, thiamethoxam, dinotefuran, nitenpyram, thiacloprid, clothianadin, or chlorfenapyr, that kills or causes knockdown of insects. The term "liquid insecticide" refers to a formulation of an insecticide where the formulation can be dispensed in an aqueous medium prior to its application to a locus where insect control is desired. The term "locus" refers to any location where control of insects is needed or expected to be needed. The term "general household pest" refers to any insect or pest, such as German cockroach, American cockroach, Smokey-Brown cockroach, Oriental cockroach, house fly, red imported fire ant (RIFA), odorous house ant, carpenter ant,

pharaoh ant, Argentine ant, mosquito, tick, flea, sowbug, pillbug, centipede, spider, silverfish, scorpion and bed bug, that cause harm or nuisance to person or property. The term "knockdown" refers to the quick (usually within 10 minutes, depending on the insect), short-term immobilization or death of the insects. The term "mortality" refers to the death of the insects. The term "% by weight" refers to the weight of the insecticide or specified component as a percent of the total weight of the composition (e.g. including the aqueous medium, other insecticides, surfactants, wetting agents, freeze/thaw agents and combinations thereof).

Those of ordinary skill in the art will appreciate that variations of the invention may be used and that it is intended that the invention may be practiced otherwise than as specifically described herein. Accordingly, this invention includes all modifications encompassed within the spirit and scope of the invention as defined by the following claims.

What is claimed is:

Claim 1. An insecticidal composition comprising a mixture of

i) a pyrethroid and

ii) at least one of

- a) imidacloprid,
- b) flonicamid,
- c) nithiazine,
- d) thiamethoxam,
- e) dinotefuran,
- f) nitenpyram,
- g) thiacloprid,
- h) clothianadin,
- i) chlorfenapyr.

Claim 2. A composition according to claim 1, wherein said pyrethroid is selected from bifenthrin, cypermethrin, zeta cypermethrin, lambdacyhalothrin, betacyhalothrin, alphacypermethrin, tralomethrin, deltamethrin, cyfluthrin, beta-cyfluthrin, esfenvalerate, fluvalinate, etofenprox or permethrin.

Claim 3. A composition according to claim 2, wherein said pyrethroid is bifenthrin.

Claim 4. A composition according to claim 1, wherein said composition is a mixture of bifenthrin and imidacloprid.

Claim 5. A composition according to claim 4, wherein the amount of bifenthrin is equal to from 0.0005% by weight to 0.12% by weight and the amount of imidacloprid is equal to from 0.0005% by weight to 0.10% by weight.

Claim 6. A method for controlling general household pests comprising applying an insecticidally effective amount of a composition of claim 1 to a locus where general

household pest control is needed or expected to be needed.

Claim 7. A method for controlling general household pests comprising applying an insecticidally effective amount of a composition of claim 2 to a locus where general household pest control is needed or expected to be needed.

Claim 8. A method for controlling general household pests comprising applying an insecticidally effective amount of a composition of claim 3 to a locus where general household pest control is needed or expected to be needed.

Claim 9. A method for controlling general household pests comprising applying an insecticidally effective amount of a composition of claim 4 to a locus where general household pest control is needed or expected to be needed.

Claim 10. A method for controlling general household pests comprising applying an insecticidally effective amount of a composition of claim 5 to a locus where general household pest control is needed or expected to be needed.

Claim 11. The method according to claim 6, wherein said general household pest is selected from German cockroach, American cockroach, Smokey-Brown cockroach, Oriental cockroach, house fly, red imported fire ant (RIFA), odorous house ant, carpenter ant, pharaoh ant, Argentine ant, mosquito, tick, flea, sowbug, pillbug, centipede, spider, silverfish, scorpion and bed bug.

Claim 12. The method according to claim 7, wherein said general household pest is selected from German cockroach, American cockroach, Smokey-Brown cockroach, Oriental cockroach, house fly, red imported fire ant (RIFA), odorous house ant, carpenter ant, pharaoh ant, Argentine ant, mosquito, tick, flea, sowbug, pillbug, centipede, spider, silverfish, scorpion and bed bug.

Claim 13. The method according to claim 8, wherein said general household pest is selected from German cockroach, American cockroach, Smokey-Brown cockroach,

Oriental cockroach, house fly, red imported fire ant (RIFA), odorous house ant, carpenter ant, pharaoh ant, Argentine ant, mosquito, tick, flea, sowbug, pillbug, centipede, spider, silverfish, scorpion and bed bug.

Claim 14. The method according to claim 9, wherein said general household pest is selected from German cockroach, American cockroach, Smokey-Brown cockroach, Oriental cockroach, house fly, red imported fire ant (RIFA), odorous house ant, carpenter ant, pharaoh ant, Argentine ant, mosquito, tick, flea, sowbug, pillbug, centipede, spider, silverfish, scorpion and bed bug.

Claim 15. The method according to claim 10, wherein said general household pest is selected from German cockroach, American cockroach, Smokey-Brown cockroach, Oriental cockroach, house fly, red imported fire ant (RIFA), odorous house ant, carpenter ant, pharaoh ant, Argentine ant, mosquito, tick, flea, sowbug, pillbug, centipede, spider, silverfish, scorpion and bed bug.

Claim 16. The method according to claim 6, wherein said locus is selected from a general household pest-infested structure, a structure that is expected to be general household pest-infested, or a location adjacent to said structures.

Claim 17. The method according to claim 7, wherein said locus is selected from a general household pest-infested structure, a structure that is expected to be general household pest-infested, or a location adjacent to said structures.

Claim 18. The method according to claim 8, wherein said locus is selected from a general household pest-infested structure, a structure that is expected to be general household pest-infested, or a location adjacent to said structures.

Claim 19. The method according to claim 9, wherein said locus is selected from a general household pest-infested structure, a structure that is expected to be general household pest-infested, or a location adjacent to said structures.

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Claim 20. The method according to claim 10, wherein said locus is selected from a general household pest-infested structure, a structure that is expected to be general household pest-infested, or a location adjacent to said structures.

ABSTRACT

The present invention relates to an insecticidal composition comprising a pyrethroid and at least one of imidacloprid, flonicamid, nithiazinc, thiamethoxam, dinotefuran, nitenpyram, thiacloprid, clothianadin, or chlorfenapyr, with significantly improved knockdown and mortality characteristics when applied to general household pests.